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10/565,171	01/19/2006	Mori Nagayama	040302-0540	7246

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EXAMINER	
WANG, EUGENIA	
ART UNIT	**PAPER NUMBER**
1745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,171	NAGAYAMA ET AL.	
	Examiner	Art Unit	
	Eugenia Wang	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) *15-43* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 September 2007* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/27/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the reply received September 12, 2007:

a. Claims 1-43 are pending, with claims 15-43 withdrawn as being drawn to an unelected invention.

b. The objections to the drawings have been withdrawn in light of the amendment, with the exception of the "prior art " label rejection (addressed below).

c. The objection to the specification is withdrawn in light of the amendment.

d. The rejection of record is maintained, thus the action is final.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on September 12, 2007 has been placed in the application file and the information referred to therein has been considered as to the merits with the exception of KR 2001-0072835A. Examiner invites Applicant to submit a translation for the aforementioned piece to receive proper consideration.

Drawings

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct

any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Response to Arguments

4. Applicant's arguments filed September 12, 2007 have been fully considered but they are not persuasive.

Applicant argues that since a "Related Art" label has been applied to Fig. 1, the objection should be overcome.

Examiner respectfully disagrees. "Related Art" does not necessarily qualify as "Prior Art." Thus the objection is maintained.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 4-7, 9, 11, 13, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0858120 (Yoshida et al.).

As to claim 1, Yoshida et al. teach a secondary battery and a method of making that secondary battery (title). In embodiment 5, Yoshida et al. teach that has a final product where the polymer, and the electrolyte, accordingly, in the electrode showed a density gradient in such a manner that it's concentration is not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently,

the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33).

As to claims 2 and 4, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes (abs). Furthermore, it is taught that the active material of the electrodes are placed on current collectors (p7, lines 17-25). As previously stated, the end product is an electrode where the polymer, and the electrolyte, accordingly, in the electrode showed a density gradient in such a manner that it's concentration is not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$ (active material), graphite powder (conductive material), polystyrene powder (binder), and a solvent as can be seen from p. 7, lines 17-33). (All of the additions to the active material mixture are solids, except for the non-active solvent.)

As to claim 5, Yoshida et al. teach that the active material mixture preferably comprises a binder resin, an organic solvent, an electrically conducting particulate material incorporated with the active material (p4, lines 41-44).

As to claims 6 and 13, Yoshida et al. teach that the electrode material applied to both the positive and negative electrode current collector is about 100 μm, which encompasses the upper limit of the claim of the instant application (p7, lines 17-25).

As to claim 7, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes, where the electrolytic solution is injected into the electrodes containing active material (abs). As previously mentioned, the end product is an electrode where the polymer, and the electrolyte, accordingly, are in the electrode in such a manner that the concentration of the polymer and electrolyte are not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33). Therefore, there is inherently a concentration gradient of electrolyte salt towards the collector, since there is less electrolyte and thus electrolyte salt towards the current collector (with the space being taken up by the active material mixture) than away from the current collector.

As to claim 9, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes, where the electrolytic solution is injected into the electrodes containing active material (abs). As previously mentioned, the end product is an electrode where the polymer, and the electrolyte, accordingly, are in the electrode in such a manner that the concentration of the polymer and electrolyte are not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene

powder as can be seen from p. 7, lines 17-33). Therefore, a concentration gradient of polymer through the thickness of the active material mixture layer and the collector exists, as it was previously stated that the polymer concentration is not strong towards the collector and is stronger on the side opposite the current collector (p7, lines 34-38). (The polymer is taken to be the film forming material.)

As to claim 11, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes, where the electrolytic solution is injected into the electrodes containing active material (abs). As previously mentioned, the end product is an electrode where the polymer, and the electrolyte, accordingly, are in the electrode in such a manner that the concentration of the polymer and electrolyte are not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33). Therefore, there is inherently a concentration gradient of electrolyte salt towards the collector, since there is less electrolyte and thus electrolyte salt towards the current collector (with the space being taken up by the active material mixture) than away from the current collector. Furthermore, a concentration gradient of polymer through the thickness of the active material mixture layer and the collector exists, as it was previously stated that the polymer concentration is not strong towards the collector and is stronger on the side

opposite the current collector (p7, lines 34-38). (The polymer is taken to be the film forming material.)

As to claim 14, Yoshida et al. teach a method of making the battery with a an active material density gradient, which consists of preparing an active material mixture, forming electrodes with the active material, assembling the electrodes into an electrode laminate, and then injecting electrolytic solution into the electrode laminate (p2, lines 54-58; p3, line 1). Specific example given in Embodiment 5 confirms the fact that the active material mixture layer has a density gradient, since the final product's polymer, and the electrolyte, accordingly, in the electrode showed a density gradient in such a manner that it's concentration is not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33).

Response to Arguments

6. Applicant's arguments filed September 12, 2007 have been fully considered but they are not persuasive.

Applicant argues that Yoshida et al. does not teach "an electrode active material layer having a density gradient," citing fig. 2 as an exemplary embodiment.

Examiner respectfully disagrees. With respect to this argument, although, this is one embodiment, it does not address the portion of the disclosure relied upon for the rejection.

Applicant argues that Yoshida et al. (p 7, lines 34-38) does not teach the active material layer having a density gradient, since the density gradient is of a polymer.

Examiner respectfully disagrees. The claim language only says that a gradient within the active material layer is needed. Therefore since there is a gradient in the polymer, the active material layer has a gradient. Furthermore, Applicant has not shown that the other materials (i.e. the active material itself) in the electrode are not in a gradient. Since there is a gradient of polymer, it would be expected that the other materials would arrange itself in a gradient that is inversely proportional to the gradient of the polymer.

Applicant argues that (a) the macroscopic variation of active material from cell to cell is different than the microscopic density gradient of an active material layer within the same cell and (b) thus cannot have the same gradient as claimed in claim 1.

Examiner respectfully disagrees with the statement. With respect to (a) from Examiner's understanding, Yoshida's teaching is to an electrode within the same cell. With respect to (a) and (b), Applicant has not provided proof that the gradients in Yoshida et al. and in the instant application are different and behave in a different matter. With respect to (b), Applicant's claim language does not limit the electrode active layer's density gradient to a microscopic density gradient.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3, 8, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al., as applied to claim 1, in view of US 2002/0028380 (Tanjo et al.).

The teachings of Yoshida et al. have been previously discussed and are herein incorporated.

As to claims 3, 8, 10, and 12, Yoshida et al. does not specifically teach that the active material mixture layer comprises a plurality of laminated thin film layers different

in (a) the solid concentration (active material) (as applied to claim 3), (b) the concentration of the electrolyte salt (as to claim 8), (c) the concentration of film forming material (polymer) (as applied to claim 10), and (d) the concentrations of the electrolyte salt and film forming material along a thickness from the surface of the current collector to the other side of the electrode.

Tanjo et al. teach an active material layer, where the active material layers have different porosities and are layered accordingly (para 0051, lines 1-3; fig. 3). Using multi-layers, power density can be increased without sacrificing energy density (para 0051, lines 6-7). Furthermore, Tanjo et al. teach that energy density is influenced by average porosity and active material amount in the active layer [20] (para 0051, lines 22-27). *And* power density can be effectively increased by balancing the diffusion in the positive active material [10] and the migration in the electrolytic solution [50] (para 0051, lines 18-22). Therefore, the motivation of making separate layers for gradients (be it of the porosity, active material concentration, electrolyte salt concentration, film forming material concentration, or a combination of the electrolyte salt and film forming material concentration) is to control power and energy density. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to create separate layers for the gradient in Yoshida et al.'s teaching in order to more effectively promote power and energy density.

Response to Arguments

8. Applicant's arguments filed September 12, 2007 have been fully considered but they are not persuasive.

Applicant first argue that since Yoshida et al. fails to teach claim 1, the combination of Tanjo et al. with Yoshida et al. would also fail to teach claim 1.

Examiner respectfully disagrees. The rejection of Yoshida et al. is maintained with the reasons set forth above. At this point Applicant is not arguing the combination, and thus the rejection stands.

Applicant argues that the motivation of combining Tanjo et al. and Yoshida et al. essentially relies on Applicant's disclosure and is thus impermissible hindsight.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Furthermore, Examiner would like to add that the rejection does not use applicant's disclosure. The argument as made above is not directed to the combination of Tanjo et al. and Yoshida et al. Since the arguments are not shown with respect to the combination of Tanjo et al. and Yoshida et al., the rejection made is maintained, as shown in the 103 rejection above.

Applicant requests rejoinder of the claims 15-43, since (a) they depend on either claims 1 and 14, which are allowable and (b) would not be a burden placed on the PTO.

Examiner respectfully disagrees with Applicant. With respect to (a), the rejection of record is maintained for the reasons set forth above. Therefore claims 1 and 14 are not allowable. With respect to (b), a burden placed on Examiner for examining all of the groups and species, as set forth in the written Election/Restriction. Furthermore, the Election/Restriction was not traversed, and a traversal at this time would be untimely. For those reasons, Examiner will not rejoin the claims at this time.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugenia Wang whose telephone number is 571-272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EW

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER